tionate amount of space given to some foreign equivalents. It is when we come to the Tertiary strata, however, that we are most painfully impressed by the inadequacy of the treatment of some very essential matters. The British Eocenes have about half a page devoted to them; there is no mention of the Hampshire Basin as distinct from that of London; and the table of strata given is neither that of one basin nor the other, but an awkward combination of beds from both. The English Oligocene is dismissed in about a dozen lines, and no mention is made of the rich and varied marine fauna of the New Forest. About the same amount of space is devoted to the Pliocene of East Anglia (that of the South Downs and Cornwall not being even mentioned), while the highly-developed Pliocene of Belgium has assigned to it only a single line.

We make these remarks, not with any desire to find fault, but in order to call the author's attention to the fact that, in its present state, the work would be almost useless to an English student, unless he used it in conjunction with another geological text-book, in which the British formations had received more adequate treatment. If the more vigorous editing, which has made the first part of this book so excellent, were applied to the latter half of the volume, we should then have an almost perfect work, and one which would find a place in every scientific library.

With all its faults, however, we have a text-book of stratigraphical geology which is superior to all its predecessors in respect to its illustrations, and its thoroughness. The copious index is of the greatest value, though the work would be improved by some additions to the references and the substitution in all cases of citations of original memoirs in the place of works giving information at second hand.

The plan of treatment of the several geological systems is excellent. The historical account of the establishment of the particular division and grouping of the strata is followed by sketches of the development of the system in the chief European areas, concluding in certain cases with shorter notices of some of the extra-European equivalents. This account of the stratigraphy of the system is followed by an admirable sketch of its palæontology.

There are two portions of the book which, to make the work suitable as a manual for English students, require to be greatly modified, if not altogether rewritten. These are the chapters relating to the Archæan and the "Diluvium" respectively. We can readily understand that the editor would shrink from so drastic a remedy as we suggest, and yet the views expressed in the book before us, upon the oldest and youngest of the formations respectively, are so entirely at variance with those which the beginner is likely to hear from any recognised teacher of geology in this country, that it is scarcely fair to students to allow them to stand in their present form. In the same way the uncompromising statements concerning the difference between the eruptive rocks associated with the tertiary and those of older geological epochs require serious qualification. If the editor felt that he could not, in fairness to the original author, make the necessary omissions or alterations in the text, he might have appended notes in which the attention of the student is called to statements that are at variance with the instruction he would ordinarily receive in this country.

Although we have felt it to be our duty to call attention to certain imperfections and blemishes in this book, we must repeat our verdict concerning its general excellence, and the hope that an opportunity will soon be afforded to its editor of preparing a second edition, in which these imperfections and blemishes may be removed.

THE BALTIC SHIP-CANAL.

Der Nord-Ostsee-Kanal. Von C. Beseke. (Kiel and Leipsic: Lipsius and Tischer, 1893.)

FOREMOST among the engineering works of the latter part of the nineteenth century must assuredly be placed the magnificent maritime canals, which afford such conspicuous evidence of industrial skill and enterprise; and of these great works few will yield in point of size and importance to the new sea-way between the North Sea and the Baltic, the history and progress of which is so ably described by Herr Beseke in the present volume.

The idea of such a canal has been under consideration for five centuries, and one of the most interesting chapters in the book is that which enumerates no less than sixteen schemes which have from time to time been propounded for the accomplishment of this difficult problem. These different projects are rendered all the more intelligible by means of a sketch-map, indicating the various lines proposed, the majority of which, having their origin in the estuary of the Elbe, passed transversely across the Schleswig-Holstein peninsula to points in the vicinity of Kiel or Lübeck.

The inception of the present undertaking dates from October 19, 1883, when the Chancellor of State was directed by Imperial rescript to report upon the execution of a canal from Kiel to the mouth of the Elbe. The plans, prepared in conformity with this decree, were adopted, with trifling modifications, on March 16, 1886, the execution of the works being entrusted to a State Commission in July of the same year, and the first stone was laid by the Emperor William I. with an imposing ceremony on June 3, 1887.

The total length of the projected canal is about 61 English miles, the width at the water-line is 197 feet, and at the bottom, at the toe of the slopes, 72 feet; the total depth is nearly 28 feet. It is shown by means of a diagram that not only will two of the largest Baltic merchant vessels pass one another without difficulty, but also that there is room for a vessel of this type to give way to one of the finest ironclads of the German navy, such as the *König Wilhelm*, with a displacement of 9757 tons. Special passing stations have, however, also been arranged at intervals, similar to those on the Suez Canal.

The cost of the works was originally estimated at £7,800,000, which provides for 77,400,000 cubic metres of excavation, and all requisite contractors' plant and materials, entrance locks, bridges, and harbour works, as also for the forts needed to protect the western approach to the canal.

A most curious chapter is that which deals with the provision made for the conduct of the enterprise, and for the housing and accommodation of the large staff of workpeople engaged therein. The sub-contractors for

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the various sections into which the works were divided—15 in number—had, under conditions carefully specified, to construct barracks for the staff of workers. The canteen arrangements were all carefully thought out, and the prices of food were regulated by fixed tariffs. The sizes of dormitories were prescribed; hospitals and laundries have to be provided, and all the sanitary arrangements appear to be most complete.

It was a condition of their engagement that the work-people should be at least seventeen years of age, no Socialists or Anarchists might be employed, and all drunken and dissolute persons were liable to instant dismissal. Some of the regulations appear slightly autocratic, but doubtless with a population of from 6000 to 8000 persons brought together from all parts of Germany, such as was to be found on certain of the sections, it was necessary to insist upon a very severe discipline. We are assured by the author that hitherto these rules have worked satisfactorily. A detailed account is given of the four bridges required for the railway crossings, also of the numerous ferries and of the massive constructions needed to form the entrance-locks of the canal at either end. The water-level of the canal is almost coincident with that of the Baltic. So that on 340 days in the year the sluices can remain open, and the lock-gates into the Elbe can be opened daily at certain states of the tide; the water in the canal is to be at one uniform level throughout.

In consequence of the advanced state of the works it seems probable that the undertaking may be formally opened for traffic at the period originally contemplated, in the summer of 1895. Steamers will be permitted to propel themselves at a mean speed of about six miles an hour, and sailing vessels and barges will be towed in train through the canal by steam-tugs provided for this purpose.

Herr Beseke presents us with most exhaustive statistics showing the saving in time caused by the use of the canal as contrasted with the dangerous passage round the coast of Denmark, and a wreck chart of the entrance of the Baltic serves as an effective object-lesson of the value to navigation of this new sea-way.

In the concluding chapters we find most ample details of the volume of Baltic commerce and of the tonnage engaged therein, both in the form of steamers and sailing vessels, and excellent diagrams and charts have been specially prepared by the author to render these facts readily intelligible to the public. Nor does Herr Beseke omit to treat of the industrial value of these works and of their importance to the Fatherland, both from the military and naval aspects; in fact their political significance is shown to be enormous.

The volume contains a mass of well-digested information upon an undertaking concerning which but little has hitherto been heard in this country, but which is destined to exert a powerful influence upon the commerce of the states bordering upon the Baltic.

OUR BOOK SHELF.

Laws and Properties of Matter. By R. T. Glazebrook, M.A., F.R.S. (London: Kegan Paul, Trench, Trübner and Co., 1893.)

THIS is the latest addition to the manuals on "Modern Science" which are appearing under the direction of Sir John Lubbock. It is concerned with the meaning of the terms applied to matter, and with the principal properties which matter possesses, and contains chapters upon units of measurement, force and motion, work and energy, the forms of matter and of energy, and upon the properties of solids, liquids, and gases.

The book is an excellent introduction to the study of the physical properties of substances, and meets the main difficulty of the beginner by supplying him with sound ideas on the ground-work of his subject. It is indeed a matter for regret that there are so few similar books on other branches of science.

Although the properties discussed are almost entirely mechanical or physical, the author occasionally touches upon the subject matter of chemistry, and here the chemical reader may perhaps be puzzled to find the term "molecule" applied in cases where he has been taught to use the term "atom." The molecular weights given on p. 184, for example, are the ordinary atomic weights of the chemist. It is impossible, however, to correctly discuss even such chemical phenomena as are given in the book, without employing the conception of atom as well as that of molecule. Thus on p. 183 it is stated that "by adding to each molecule of carbonic oxide a second molecule of oxygen we get carbonic acid." This conclusion is not in harmony with Avogadro's hypothesis, for carbonic oxide unites with half its volume of oxygen to form carbonic acid.

The value 411° is much higher than those recently obtained for the critical temperature of water. On p. 19 "dynes in a given mass" should be "dynes in a given weight." The formulæ on pp. 164 and 180 are not correctly printed.

J. W. R.

The Partition of Africa. By J. Scott Keltie. (London: Edward Stanford, 1893.)

THE author of this book does not wish it to be regarded as a contribution either to the geography of Africa or to the history of African exploration. His object has been to present "a brief connected narrative of the remarkable events which, during the last eight years, have led to the partition of the bulk of Africa among certain of the powers of Europe." In carrying out this purpose, Mr. Keltie displays wide knowledge, sound judgment, and an admirable power of lucid and effective exposition. The details of his narrative do not come within the scope of NATURE, but we may note that in his occasional references to the scientific aspects of the subject he invariably gives evidence of a thorough grasp of the principles which can alone be of vital service in the study of geography. This is especially true of a luminous and interesting chapter on "the economic value of Africa." The importance of the work is greatly increased by a large number of carefully-selected and well-executed maps.

Forest Tithes, and other Studies from Nature. By a Son of the Marshes. Edited by J. A. Owen. (London: Smith, Elder, and Co., 1893.)

BY "forest tithes" are meant the quantities of food secured at the expense of rural folk by wild creatures of the moorlands. The subject is an attractive one, and in dealing with it the author of this little volume presents many bright and lively sketches of animal life. The essays on other subjects are in their own way not less pleasant. They all display an ardent love of nature and a remarkable power of minute and accurate observation—qualities which have won for "a Son of the Marshes" a place of his own among the popular writers of the day. Some of the articles have already appeared in various publications; others are now printed for the first time.

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